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ENERGY EFFICIENCY OF BUILDINGS REVIEW IN 2016

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Abstract: The Energy Performance of Buildings Directive (EPBD) is the European Union's main legislative instrument aiming to promote the improvement of the energy performance of buildings within Community. It was inspired by the Kyoto Protocol which commits the EU and all its parties by setting binding emission reduction. The first version of the EPBD (Directive 2002/91/EC), was approved on 16 December 2002 and entered into force on 4 January 2003. The Directive required the MS strengthen the building regulations and introduce Energy Performance Certificates (EPCs). Directive 2002/91/EC was later on replaced by the so-called "EPBD recast", which was approved on 19 May 2010. This version of the EPBD broadened its focus on nearly Zero-Energy Buildings (nZEB), cost optimal levels of minimum energy performance requirements as well as improved policies. 2016 is an important year for energy efficiency legislation at EU level, with the upcoming revisions of the EPBD and Energy Efficiency Directive (EED). On 30 November 2016 published its "Clean Energy for All Europeans" package, also known as the "Winter Package". With an appropriate framework, buildings could play a central role in transforming the EU energy system. Buildings are entering a transition phase, transforming into highly efficient micro energy-hubs consuming, producing, storing and supplying energy, making the system more flexible and efficient enabling a rapid uptake of renewable energy and electric vehicles. The Paris Agreement provides a common framework within which individual countries are invited to define nationally determined contributions (NDCs) taking account the overall goal of the UN Framework Convention on Climate change.

Keywords: EPBD, energy performance of buildings, energy system

1. INTRODUCTION: LONG-TERM VISION UNTIL 2050 FOR THE BUILDING STOCK IN EUROPEAN UNION

Last years, the European Union has given a major importance to climate and energy issues in order to reduce excessive dependence of imports of energy resources. Building sector is one of the five key sectors to achieve the 20/20/20 targets of the European Union. On 25 October 2012, the EU adopted Directive on energy efficiency (Energy Efficient Directive 2012/27/EU, EED 2012/27/EU) [1]. This Directive establishes a common framework of measures for the promotion of energy efficiency within the EU to goal the 20/20/20 targets to reduce climate impacts and energy consumption.

EU leaders have the need to increase energy efficiency as part of the 20/20/20 goals for 2020: saving 20% of the EU's primary energy consumption by improvement in the energy efficiency, raising the share of EU energy consumption from renewable resources for 20% and a 20% reduction in EU of greenhouse gas emission, relative to 1990 levels. Figure 1 shows Meeting of all three "20/20/20 targets by 2020".

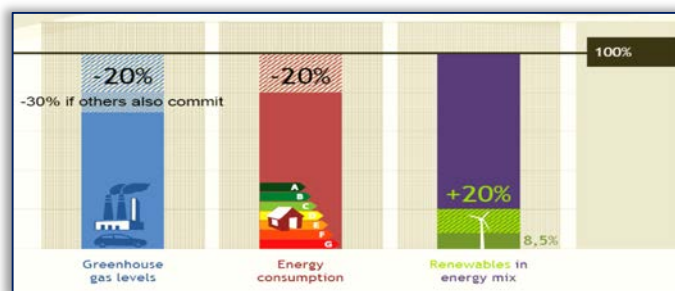


Figure 1. Meeting of all three "20/20/20 targets by 2020"

In order to achieve the targets for 2020 and continue the pathway to the energy targets for 2030, the European Commission on 30 November 2016 published long-awaited new 2030 Framework for climate and energy package, entitled "The Clean Energy for All Europeans" package, also called "Winter Package". This package is also press release as "Clean Energy for All European" - unlocking Europe's growth potential" [2], as part of the measures aimed at the realization of the European Energy Union. The Energy Union is today one of the ten priorities Commission, together with (COP21 – 21 Conference of Parties, Paris climate conference or Paris Agreement, The Paris Agreement Summary, 12 December 2015) [3]. COP21 was the 21 "Conference of Parties" - an annual UN conference on the subject of the climate, and climate change.

The present framework, which will expire at the end of 2020, is defined by three key targets ("20-20-20"). The new 2030 of the framework is the enhancement of the current climate and energy policy that will be implemented to achieve the EU's long term aim of becoming a low-carbon economy by using less fossil fuel.

The European Commission in the Clean Energy for All Europeans presents a package of proposals to keep the European Union competitive as the clean energy transitions is changing the global energy markets. This package including proposals for reviewing the Energy Performance of Buildings Directive (EPBD) [4], Energy Efficiency Directive (EED) and Renewable Energy Directive (RED) [5]. The “Clean Energy for All Europeans” proposals are intended to help the Energy sector become more stable, more competitive and more sustainable.

- Putting energy efficiency first,
- Achieving global leadership in renewable energies and
- Providing a fair deal for consumers

European Union Countries have agreed on a new 2030 Framework for climate and energy, for the period between 2021 and 2030. These targets aim to help the EU achieve a more competitive, secure and sustainable energy system and to meet its long-term 2050 greenhouse gas reduction target.

The European Council agreed in 2009 to support the long-term objective of reducing EU GHG emissions by 80-95 % by 2050, compared to 1990 levels, in the context of necessary reductions according to the Intergovernmental Panel on Climate Change (IPCC) by developed countries.

In October 23 and 24, 2014, the European Council approved the 2030 Framework for Climate and Energy. The decisions was formed well in advance of the, Paris Climate Conference (COP21), in order to facilitate the submission of the EU’s offer by early 2015. The objectives to be met by 2030 consisted [6]:

- A binding EU target of at least 40% domestic reduction of GHG emissions by 2030, compared to 1990 levels,
- A binding target of at least 27% of renewable used at EU level,
- An “indicative” and non-binding target of at least 27% increase of energy efficiency. This target will be further reviewed in 2020, having in mind a level of 30% for 2030.

The Clean Energy for All Europeans proposals sets out the energy policy framework going forward to 2030 and beyond. It contains important proposals for a wide range of energy-related issues including energy markets, energy infrastructure, renewable energy, climate policy, and energy demand,

The winter package is meant to deliver on the commitment of the European Union to make “efficiency first” a guiding policy principle in the future energy policy making. Energy efficiency is one of the key elements of the Clean Energy for All Europeans package and features in the various legislative proposals.

Energy use in buildings represents about 40% of all final energy in the EU and emit 36% of greenhouse gases because they are old and inefficient and wasting up to 80% of all energy delivered to them. However, they could already be energy renovated with existing technologies and modern approaches to make them low energy and high performance.

The revision of the EPBD and EED offer a unique opportunity to ensure consistency between the policy frameworks for buildings a nearly zero energy buildings, fully decarbonised building stock by 2050.

The revision of the EED aims to speed up building renovation, from the current annual 0.4-1.2 rate to reach a 3% by 2020 and to maintain that rate until 2050. Figure 2 shows graphical presentation what renovation rate is needed.

The Renovate Europe Campaign (REC) that was established in 2011, it brings together companies and associations that are convinced of the EU economy and society of reducing the energy demand of existing buildings. Renovate Europe is a political communications campaign with ambition to reduce the energy demand of the building stock in the EU by 80% by 2050 compared to 2005 levels through legislation ambitious renovation programmes.

This will bring the energy performance of the entire building stock in the EU to a Nearly Zero Energy Buildings (nZEBs) performance levels. A decarbonized building stock by 2050 requires the big majority of buildings in the EU to be highly energy efficient, complying, at least with an Energy Performance Certificate label “A”. BPIE’s analysis of available data finds that less than 3% of the building stock in the EU qualifies the A Label. The Parliament argues that demand in buildings could be reduced by up three quarters if the renovation of buildings is speeded up, that deep renovation is particularly important because 75% of the existing European building stock is energy inefficient, and estimates show that 90% of these buildings will still be in use by 2050 [7].

In fact its objectives are to:

- Reduce the energy demand of the building stock by 80% by 2050 as compared to 2005;
- Increase the rate of renovation in the EU the current 1% to reach 3% by 2020 and maintain that rate until 2050;

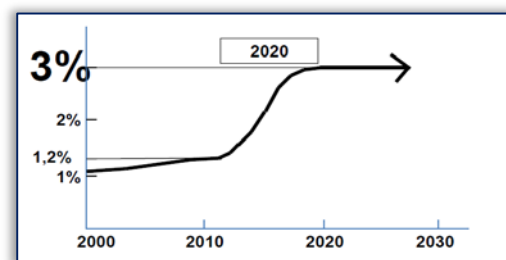


Figure 2. Renovation rate needed by years

— Ensure that all renovations are deep or staged deep renovations that capture the full cost effective potential in each project.

2. CLEAN ENERGY FOR ALL EUROPEANS PACKAGE

EU countries have proposed on a new Framework for climate and energy, including EU-wide targets and policy objectives for the period between 2021 and 2030. These targets aim to help the EU achieve a more competitive, secure and sustainable energy system and to meet its long-term 2050 greenhouse gas reduction target. The targets are based on a thorough economic analysis that measures how to cost-effectively achieve decarbonisation by 2050. The European Council agreed on the 2030 climate and energy framework on 23-24 October 2014. The 2030 climate and energy framework sets three key targets for the year 2030:

- The framework contains a binding target to cut emissions in EU territory by at least 40% below 1990 levels by 2030;
- The framework sets a binding target at EU level to boost the share of renewable to at least 27% of EU energy consumption by 2030;
- On the basis of the Energy Efficiency Directive, the European council has indorsed an indicative energy savings target of 27% by 2030. This target will be reviewed in 2020 having in mine a 30% target.

The “Clean Energy for All Europeans” [8]; [9] proposals are intended to help the Energy sector become more stable, more competitive and more sustainable. With a view stimulating investment in the clean energy transition, the package has three main goals:

- Putting energy efficient first;
- Achieving global leadership in renewable energies and;
- Providing a fair deal for consumers.

The role of buildings in the transition to a sustainable and secure energy system must be recognized and supported across all of the legislation in the package, not only the Energy Performance of Buildings Directive (EPBD), the Energy Efficiency Directive (EED) and Renewable Energy Directive (RED) and the package of legislation to the electricity market and consumers. Including an unambiguous long-term vision for buildings: the building stock should meet high efficiency and zero carbon standards by 2050.

For decarbonised building stock by 2050 requires the big majority of buildings in the EU to be highly energy efficient, complying, at list, with Energy Performance Certificate (EPC) label “A”. But a BPIE’s analysis show that less than 3% of the current building stock in the EU are with EPC “A” label. An analysis of data for 16 countries, covering 66% of the European total floor area, shows that over 97% of the building stock must be upgraded to comply the 2050 decarbonisation vision.

The package includes 8 different legislative proposals covering, and some accompanying documents [10].

The packages of legislative proposals covering:

- Proposal for a recast of the Internal Electricity Market Directive;
- Proposal for recast of the Internal Electricity Market Regulation;
- Proposal for a recast of the ACER (The Agency for Cooperation of Energy Regulators) Proposal for a Regulation on Risk-Preparedness in the Electricity Sector and Repealing the Security of supply Directive;
- Proposal for a Recast of the Renewable Energy Directive;
- Proposal for a revised Energy Efficiency Directive;
- Proposal for a revised Energy Performance of Buildings Directive;
- Proposal for a Regulation on the Governance of the Energy Union.

Five of the proposed legislative instruments that directly affect the Energy Union’s goals to deliver greater energy efficiency to European energy economies are: the revised Energy Efficiency Directive (EED), the Energy Performance Buildings Directive (EPBD), the Directive on common rules for the Internal Energy Market for Electricity (IEM), the Regulation on the electricity market, and the Regulation Governance of the Energy Union.

Other parts of the package include:

- Communication on Eco-design working plan
- Communication on accelerating clean energy innovation
- Communication on a European strategy on cooperative, intelligent transport systems
- Separate reports on Energy prices and costs in Europe and European Energy Programme for Recovery (EEPR) and the European Energy Efficiency Fund.

European Union Countries have agreed on a new 2030 Framework for climate and energy [11], for the period between 2021 and 2030. These targets aim to help the EU achieve a more competitive, secure and sustainable energy system and to meet its long-term 2050 greenhouse gas reduction target.

The European Council agreed in 2009 to support the long-term objective of reducing EU GHG emissions by 80-95 % by 2050, compared to 1990 levels, in the context of necessary reductions according to the Intergovernmental Panel on Climate Change (IPCC) by developed countries.

To outline the path towards achieving this commitment to a low-carbon future, the European Commission presented the “Roadmap for moving to a competitive low-carbon economy in 2050”. Within this document it is suggested that by 2050, the EU should cut emissions to 80% below 1990 levels through domestic reductions alone. This goal is considered to be achieved in a cost-effective way by setting intermediate targets for 2030 and 2040, at 40% and 60% reduction, respectively.

It is frequently concluded that 75% of the building stock is energy inefficient, implying that these should be renovated to higher energy efficiency class and estimates show that 90% of these buildings will still be in use by 2050. Figure 3 shows the distribution of the building stock in the EU per EPC class.

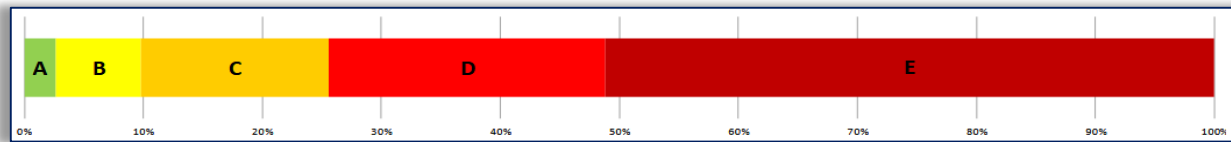


Figure 3. Distribution of the building stock in the EU per EPC class

Figure 3 shows distribution of the EU Building Stock per EPC class, from the EU Building Stock Observatory (BG, FR, ES, NL, IT, FI), national databases (DK, HU, PT, EN & WAL, IE, LT, FL) and reports by the Concerted Action EPBD (EE, SL, WL).

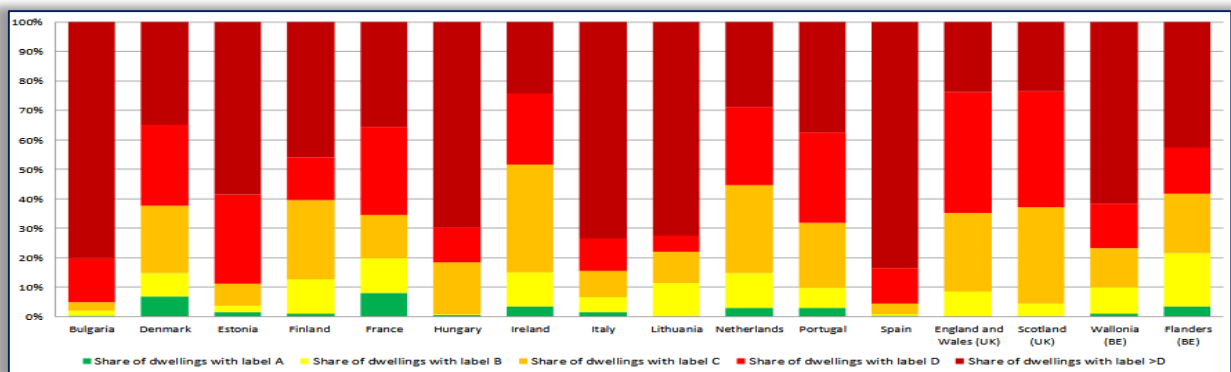


Figure 4. Distribution of the building stock in the EU per EPC class, by countries

The challenge to eliminate CO₂ emissions from the building sector is possibly with EPC distribution (Figure 3) or the average U-value (Figure 4). On Figure 5 is presented age of the EU building stock and corresponding U-value (illustrated by the black bars) for building envelopes. The 2010 data for U-values is based on average of just seven countries, while others are based on average of all 28 Member States.

3. BUILDINGS AS MICRO ENERGY-HUBS

In February 2015, the principle of Efficiency First [12] was formally endorsed by the European Commission within the framework of the Energy Union.

The EU’s energy infrastructure faces numerous challenges over the next decades. It needs to be decarbonized whilst ensuring the competitiveness of EU industry, providing energy security, addressing energy poverty, and empowering consumers, who play a crucial part in the energy system of the future. Getting those choices right is key for ensuring a sustainable, fair, and affordable and secure energy future. The principle of “Efficiency First” delivers on all three.

The new global economy is shaped by the decarbonization imperative and by other drivers of change such as digitization, mass customization, servitisation, greater circularity and resource efficiency. These concurrent events will have a foundation impact on the energy system as we know it. It will transition from a centralized, fossil-fuel-base, highly-energy-consuming towards an energy efficient, more decentralized renewable-energy-

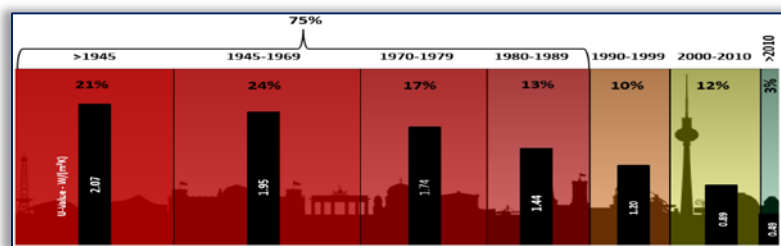


Figure 5. Age of the building stock and corresponding average U-value for building envelopes

based and interdependent system. A growing number of renewable energy systems (RES) connected to the grid, in parallel with a reduced energy consumption, is essential to achieve a sustainable and decarbonized energy system. At the same time, variable RES put additional stress on the grid given their intermittent generation, exacerbated by the fact that grid infrastructure is not ready to absorb a large amount of decentralized production facilities. Buildings can play an enabling role in this transformation.

By viewing buildings as stand-alone units using energy supplied in various forms, they are overlooking a huge opportunity. Buildings are in a transition phase, moving from being unresponsive and highly-energy-demanding elements to becoming highly-efficient micro energy-hubs [13] consuming, producing, storing and supplying energy, making the system more flexible and efficient and efficient enabling a rapid uptake of renewable energy and electric vehicles.

A micro-hub can be considered as a building or a group of buildings flexibly connected and synchronized with an energy system, being able to produce, store and/or consume energy efficiently. It can be flexible, adapting to the needs and simultaneously strengthening the energy system. The figure 6 presents the building flexibility and synchronized with an energy system. The increased portion renewable energy systems – key to achieve a sustainable and decarbonized energy system- causes variable stress on the grid. The growing number of electric vehicles, together with a bigger share of electrical heating of buildings, will challenge the energy system even further. The tendencies highlight the need for the implementation of strategies integrating smart buildings and electric vehicles to avoid a system overload.

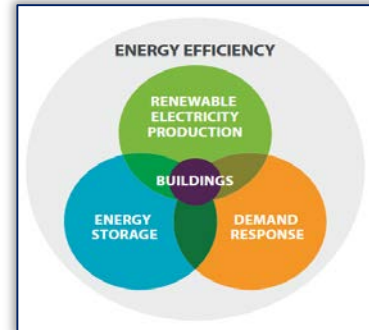


Figure 6. Buildings flexibly connected and synchronized an energy system

There is a question, what role can smart buildings play in the future energy system, by presenting ten interrelated principles. Apart from principle 1 (energy efficient first), the sequence of the nine remaining principles not laid out in order of importance. They are all important separately, but more effective considered in a holistic approach to fully achieve decarbonized transition pathways. Building further on these principles, the extent to which the Member States of the EU are ready for transition to a smart building stock is assessed and evaluated.

The building stock and the energy systems are at the initial stages of a journey to being smart: moving from a centralized, fossil fuel-based and highly energy consuming system towards one that is efficient, decentralized, automated, consumer-focused and powered by renewable energy system. With the Paris Agreement, the world's countries agreed to limit global warming to below 2°C, which implied a renewable emphasis on need for Europe to accelerate to smart energy transition. The ongoing review of the EPBD and EED is the primary opportunity to push forward the transition and embed the principles needed to deliver the benefits of smart buildings to European citizens.

BPIE has developed ten principles for buildings to work as micro energy-hubs and to be at the core of a decarbonized and decentralized energy system. Building further on these principles also assesses the extent to which Member States across Europe are ready for transition to a highly efficient and smart building stock. It considers whether buildings are efficient and healthy, whether they optimize and control use of resources, and whether they respond to the needs of the energy system and enable renewable energy.

≡ THE TRANSITION TOWARDS MICRO ENERGY-HUB

Several case studies have demonstrated that viewing buildings as stand-alone units using energy supplied in various forms, there are a huge opportunity. With the appropriate support, buildings play a leading role in transforming the EU energy system increasing the speed with which the three biggest CO₂ polluters – the buildings, transport and power sectors – are reducing their climate impact. A micro energy-hub can be considered as a building or a group of buildings flexibly connected and synchronised with an energy system, being able to produce, control, store and/or consume energy efficiently. Energy can saved, generated, stored and used where people spend most of their time in buildings. Here is not intend to emphasis one specific energy carrier, it is about the convergence, alignment and sychronisation between heat and electricity. Both are essential and can be produced in a sustainable way, as well as being, stored and transported in and around buildings.

≡ TEN PRINCIPLES OF BUILDINGS TO FUNCTION AS MICRO ENERGY-HUB

Ten interrelated principles have been drawn from an understanding of how buildings can effectively function as micro energy-hubs. They are all important separately, but most effectively considered together. Apart from

principle 1 (Energy efficient first) which should be applied first, the sequence of the nine remaining principles below must be in place to fully achieve the optimal transformation of the energy system. The key factors of micro energy-hubs are:

- Have a maximum level of building efficiency by optimizing the combination between the building shell and the technical systems;
- Empower residents to become masters of their own renewable energy production and use;
- Allow end-users to lower their energy invoices;
- Facilitate the surge of renewable energy, smart cities and electricity vehicles;
- Reduce demand peaks and unlock demand side storage and flexibility.

The ten principles of buildings to function as micro energy-hubs are as follow:

- Principle 1: Maximise the buildings' energy efficiency first
- Principle 2: Increase on-site or nearby renewable energy production and self-consumption
- Principle 3: Stimulate energy storage capacities in buildings
- Principle 4: Incorporate demand response capacity in the building stock
- Principle 5: Decarbonise the heating and cooling energy for buildings
- Principle 6: Empower end-users via smart meters and controls
- Principle 7: Make dynamic prices signals available for all consumers
- Principle 8: Foster business models aggregating micro energy-hubs
- Principle 9: Build smart and interconnected districts
- Principle 10: Building infrastructure to drive further market uptake of electric vehicles

≡ **PRINCIPLE 1: MAXIMISE THE BUILDINGS' ENERGY EFFICIENCY FIRST**

Energy efficiency and demand flexibility measures are fully complementary. Thus, switching focus from energy efficiency to energy flexibility is not desirable, unless the energy efficiency potential is fully exploited first. A deep energy renovation of the existing building stock could reduce energy demand by 80% before 2050 compared to 2005 levels. A highly energy efficient building stock, realized by deep renovation and efficient new buildings, brings multiple benefits for demand reduction, but will also enable demand response and the integration of volatile renewable energy increase on the supply side.

An energy efficient building enables the end-user to shift its heating or cooling demand: well-designed and efficient buildings maintain the desired indoor temperature better and over a long period, which makes them more appropriate for preheating or precooling, allowing energy consumption shifts to other time periods.

Since the real potential of demand response lies in thermal applications, the trend of heat pumps' market uptake leading to a significant increase in electricity demand highlights the potential, but at same time the need of the building stock to better interact with the grid. A shift from boilers with conventional fuels to electrically-driven heating systems could induce a significant increase in peak electricity demand. Demand response could compensate for this peak, for which heat pumps with lower capacity are more appropriate. Furthermore, heat pumps achieve their most optimal performance in buildings with lower heating demand, highlighting once more the importance of energy efficient buildings.

Demand response provides an opportunity for consumers to play a significant role in the operation of the electric grid by reducing or shifting their electricity usage during peak periods in response to time-based rates or other forms of financial incentives [14]. Demand response programs are being used by some electric system planners and operators as resource options for balancing supply and demand. Such programs can lower the cost of electricity in wholesale markets, and in turn, lead to lower retail rates. Methods of engaging customers in demand efforts include offering time-based rates such as time-of-use-pricing, critical peak pricing, variable peak pricing, real time pricing, and critical peak rebates. It also includes direct load control programs which provide the ability for power companies to cycle air conditioners and water heaters on and off during periods of peak demand in exchange for a financial incentive and lower electric bills.

The electric power industry considers demand response programs as an increasingly valuable resource option whose capabilities and potential impacts are expanded by grid modernization efforts. For example, sensors can perceive peak load problems and utilize automating switching to divert or reduce in strategic places, removing the chance of overload and resulting power failure. Advanced metering infrastructure expands the range of time-based rate programs that can be offered to consumers. Smart customer systems such as in-home displays or home-area-networks can make it easier for consumers to changes their behavior and reduce peak period consumption from information on their power consumption and costs. These programs also have the potential to help electricity providers save money through reductions in peak demand and the ability to defer

construction of new power plants and power delivery systems—specifically, those reserved for use during peak times.

4. REVIEW OF EPBD, EED and RED: MAKING ENERGY EFFICIENCY in BUILDINGS a REALITY

2017 is a big year for the European energy policy. The legislative proposals in the European Commission's recently released long-awaited "Winter Package" will be negotiated in the European Council and European Parliament. Those negotiations will be of critical importance as the Winter Package addresses all areas of the energy system and will shape the policy framework for many years post-2020. Energy efficiency is one of the key elements of the Winter Package and features in the various legislative proposals. The key elements of five of the proposed legislative instruments that directly affect the Energy Union's goals to deliver greater energy efficiency to European energy economies: the revised the Energy Efficiency Directive (EED), the Energy Performance of Buildings Directive (EPBD), and the Renewable Energy Directive (RED) [15].

≡ REVIEW OF THE ENERGY EFFICIENCY DIRECTIVE 2012/27/EU

The uses a target of approach to set the framework conditions for the energy and climate goals. It is approach that has proven to be effective, as it gives a signal for planning the level of ambition in energy efficient programmes and measures. Implementation of these programmes and measures and is therefore an approach that should be continued into the future.

The Energy Efficiency Directive 2012/27/EU (EED 2012/27/EU) was designed to achieve a 20% energy consumption reduction target across the EU. The EED puts in place a number of important provisions to be implemented by Member States, national building energy efficiency strategies, a requirement to renovate 3% of public buildings each year, the need to establish energy efficiency obligation schemes, and provisions for auditing and metering. The most important Article of the Directive (Article 7) requires Member States to implement Energy Efficiency Obligations and/or alternative policy instruments in order to reach a reduction in final energy use of 1.5% per year.

The Winter Package proposes a 30% energy savings target by 2030, instead of the 27% initially discussed in the 2030 Energy Strategy. The target relates to a reduction of primary energy compared to a 2007 baseline. The Commission's analysis that a 30% target represents a drop in final energy consumption of 17% by 2030 compared to 2005.

Previous analysis has demonstrated that the cost-effective potential for energy efficiency exceeds 30% of primary energy compared to a 2007 baseline significantly and this is one of the reasons the European Parliament has called for a 40% target by 2030. This means there is a case to be made for a more ambitious target for economic reasons alone.

The other main change regarding the headline target is the nature of the target. Previously, the 20% target was non-binding and Member States were required to indicate their individual contributions to that target to the European Commission.

≡ REVIEW OF THE ENERGY PERFORMANCE OF BUILDING DIRECTIVE 2010/31/EU

The proposal from the Commission amends directive 2010/31/EU on the energy performance of buildings. According to the proposal, the main objective is to accelerate the cost-effective renovation of existing buildings, which represents option for the EU economy as a whole. Directive as 2010/31/EU contains several provisions to improve the energy efficiency of both new and existing buildings. On 30 November 2016, the European commission presented a proposal for a modest revision of the EPBD 2010/31/EU, part of the Winter Package that aims to deliver on the 2030 energy and climate goals. The EPBD is oriented towards achieving EU targets in energy efficiency. The main provisions of the proposal for revised EPBD are the following:

- Member States will introduce specific mechanisms to support the smart financing of building renovations;
- Long term building renovation strategies are introduced in the EPBD (previously in the EED). These will become part of the integrated national energy and climate plans envisaged in the proposed regulation on Energy Union governance;
- New buildings need to fulfill a general obligation to meet minimum energy performance requirements;
- Definition of technical building systems broadened to include on-site electricity generation and on-site infrastructure for electro-mobility (e.g. electric cars);
- New non-residential buildings with more than ten parking spaces, and non-residential buildings with than ten parking spaces undergoing major renovation will have to equip one parking space per ten electromobility. This will apply to all non-residential with more than ten parking spaces buildings as of 2025, including buildings where the installation of recharging points are sought under public procurement. New residential buildings with over ten parking spaces, and those undergoing major renovation, will have to put in place the pre-cabling for electric recharging;

— More effective provisions introduced on regular inspections of heating and air-conditioning systems, building automation and control.

≡ REVIEW OF THE RENEWABLE ENERGY DIRECTIVE 2009/28/EC

On 30 November 2016 the European Commission presented a proposal for a recast of the Renewable Energy Directive 2009/28/EC (RED 2009/28/EC), as a part of the broader Winter Package. The main purpose of the recast RED is to increase the share of Renewable Energy Systems (RES) in the EU energy mix to at least 27% by 2030 (a goal set by the European Council in October 2014), and take measures to ensure that the EU becomes the world leader in renewable energy. The commission proposal has the following main objectives:

Achieving the 2030 energy target:

- Member States must ensure the binding renewable target at least 27% of EU final consumption from RES achieved;
- Member States' contributions to the overall 2030 target will be in integrated national energy and climate plans, in the new proposal for a regulation on Energy Union governance;
- From 2021 the level of renewable energy in final consumption in Member States shall not be lower than national binding target set for 2020 by the existing RES directive.

Further adapting the electricity sector to renewable:

- Member States make RES support schemes are aligned with state-aid rules cost-effective and not distorting electricity markets;
- Member States shall ensure progressive opening schemes to installations located in other Member States generating electricity from RES;
- Member States shall create by 1 January 2021 administrative contact points for applicants for permits to build and operate RES installations and infrastructure.

Empowering and informing consumers:

- Member States shall ensure that self-consumers who produce electricity can consume without undue restrictions and can sell the excess of energy produced to the grid;
- Member States shall ensure that energy communities (in which local citizens participate in renewable energy projects) can fully participate in the market without discrimination;
- Information on district heating energy performance and the share of renewable energy in the energy system will be made available to consumers.

The European Council set out its views on how the 2030 EU renewable energy target should be achieved in the resolution of 15 December 2016 on towards a European Energy Union. Parliament reiterated its request for a binding target of at least 30% RES share in total energy consumption by 2030, to be achieved by means of binding.

The EU energy ministers debated the proposed revisions to the RES directive. Some concerns were raised about the provisions on cross-border tenders, the voluntary 1% increase in the use of RES in heating and cooling, and the potentially excessive application of state aid rules the future RES support schemes.

5. PARIS CLIMATE CONFERENCE 2015 (COP21, 21 Conference of Parties)

The international political response to climate change began at the Rio Summit in 1992, where the "Rio Convention" included the adoption of the UN Framework Convention on Climate change (UNFCCC). This convention set out a framework for action aimed at stabilizing atmospheric concentrations of greenhouse gases (GHGs) to avoid "dangerous anthropogenic interference with the climate system". The first Conference of the Parties (COP) took place in Berlin in 1995. It was at the third session of COP in Kyoto, Japan in 1997, that the Kyoto Protocol (an extension to the UNFCCC) was adopted.

In 2015 the COP21 also known as the Paris Climate Conference (also as Paris Agreement) led for the first time in over 20 years of UN negotiations to a new international climate agreement, applicable to all countries, in accordance with recommendations of the Intergovernmental Panel on Climate Change (IPCC).

On 12 December 2015, 197 Parties to the UNFCCC adopted the Paris Agreement, a new legally-binding framework for an internationally coordinated effort to tackle climate change. The Agreement represents the culmination of six years of international climate change negotiations under and was reached under intense international pressure. 12 December 2015 will go down in history as a key date for humanity.

The 197 "Negotiating parties" committed to drawing up long-term low greenhouse gas emission development strategies. This is the first time that a universal agreement was reached in the fight against climate change. A new era in global cooperation has begun. Historic is the word most commonly used to describe the Paris Agreement. It is the first universal agreement in the history of climate negotiations.

France played a major role in this historic event, pulling out all the stops to ensure the success of the Paris Climate Conference. As host and chair of the COP21, France committed to supporting a multilateral negotiations process and listening to all stakeholders to reach an agreement that is:

- Universal and legally binding;
- Fair and differentiated;
- Sustainable and dynamic.

The agreement sets out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming. The Paris Agreement is a bridge between today's policies and climate-neutrality before the end of the century. The Paris Agreement aims to hold global temperature below to 2°C above pre-industrial levels and to pursue efforts to limit to temperature increase 1.5°C by the end of the century. It requires countries to formulate progressively more ambitious climate targets which are consistent with this goal.

The Paris Agreement defines a universal, legal framework to strengthen the global response to the threat of climate change. It establishes the obligation of all Parties to contribute to climate change mitigation and adaptation.

The Paris Agreement puts emphasis on processes rather than on defined mitigation goals. Unlike the Kyoto Protocol, the Paris Agreement does not formulate country specific emissions targets.

The Paris Agreement recognizes the different points and responsibilities of countries, and emphasizes that the Agreement will be implemented in accordance with the principle of common but differentiated responsibilities in the light of different national circumstances.

The Paris Agreement establishes the main framework for cooperative action on climate change beyond 2020 and will replace the Kyoto Protocol. The Agreement is a treaty as a matter of international law, which means that ratifying countries will be bound to one another by its terms when it comes into effect.

The Paris Agreement with its focus on voluntary contributions depends on a mechanism that allows individual Parties and the COP to assess whether Parties are on track to meeting the overall objective of the Agreement.

The Agreement establishes a facilitative compliance mechanism that is based on expert review and facilitation. The mechanism will function in a manner that is transparent, non-adversarial and not-punitive.

The Decision calls for enhanced action prior to 2020 [16]. This can be summarized in the following categories:

- **Mitigation.** Parties are urged to ratify and implement the second commitment period to the Kyoto Protocol up to 2020, to make and implement a mitigation pledge, and improve measuring and reporting processes.
- **Adaptation.** Parties have decided to launch a technical examination on adaptation, which will function in a similar manner to the technical examination on mitigation, focusing on lesson sharing and identifying opportunities for implementation and cooperative action.
- **Finance.** The COP Decision strongly urges developed countries to scale up their levels of financial support with a concrete plan to reach the USD 100 billion target by 2020.
- **Other.** Annual high level events' will be convened from 2016 through 2020. These are designed to create the space for voluntary initiatives and coalitions to be established, and provided a platform for countries to announce ambitious actions.

6. CONCLUSIONS

The proposed Clean Energy for all Europeans or Winter Package, policy package is a unique opportunity to shape what European building stock will look like in 2030.

Buildings are an integral and elementary part of Europe's energy system and should play a pivotal role in the clean energy transformation. For buildings to be able to wield this responsibility as micro energy-hubs empowering occupants to control their own renewable energy production and consumption.

The Clean Energy for All Europeans policy package should lead the way, in terms of how to incorporate buildings as micro energy-hubs in the European energy system. Europe's innovation and technology leadership could gain a much-needed support through this transformation of the building stock, benefitting both the economy and European citizens, by providing healthier places to live and work, as well as innovation and jobs in the construction sector. The Clean Energy for All Europeans package should build the legislative foundation for the transition to a decarbonised and smart building stock. The European building stock is the cornerstone of the European society.

The key conclusions from reviewing the Winter Package are the revised the Energy Efficiency Directive (EED), the Energy Performance of Buildings Directive (EPBD), and the Renewable Energy Directive (RED). The 10 interrelated principles and accompanying key success factors are essential to allow buildings to fully take up an active role in the energy system, shaping their role as micro energy-hubs and unlocking opportunities over new and tailored services.

The concept of Efficiency First, explains the importance of a high-level commitment to the concept, and provides illustrations of areas where such a commitment would play out in European policy and legislation. Yet there are many more key policy areas where an Efficient First approach could, and should be made to deliver an even greater impact and to improved outcomes.

A vision of how Efficient First can be integrated into the EU policy fabric identifying the many opportunities for Efficient First will only happen through a systematic inquiry that draws on input from a wide range of stakeholders. The Energy Union Communication provides the opportunity to launch a high-level Efficient First commitment, and to begin to shape how such an inquiry will be undertaken, in parallel with the EU' work plan for realizing its broader energy objectives.

The Paris Agreement provides a common framework within which individual countries are invited to define nationally determined contributions (NDCs) taking into account the overall goal of the Convention and the Agreement as well as their own capacities. The hope is that with increased transparency and an ambitious overall target, countries will step forward with ambitious national plans.

The collaborative approach of the Paris Agreement and the newly won trust in international action will provide a sound basis for long term, international cooperation on climate change. As costs for climate change mitigation are driven down by technological advancements and alternative energy systems start to support development, NDCs should become more ambitious, and the efforts more aligned with the overall goal than current mitigation plans.

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